

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include changes to Figs. 16-18. These sheets, which including Figs. 15-18, replace the original sheets which include Figs. 15-18. In Figs. 16-18 the legend "Prior Art" has been added.

Attachment: Replacement sheets

REMARKS

Claims 1-13 are currently pending, wherein claims 1, 2, and 7-13 have been amended to correct typographical or translation errors. Applicant respectfully requests favorable reconsideration in view of the remarks presented herein below.

Double Patenting

In paragraph 1 of the Office Action ("Action"), the Examiner rejects claims 1 and 13 under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 1 of copending Application Serial No. 10/482,815. Applicant respectfully requests that these rejection be held in abeyance until such time as claims 1 and 13 are indicated as containing allowable subject matter.

In paragraph 2 of the Action, the Examiner rejects claims 7-12 under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 6 of copending Application Serial No. 10/482,815. Applicant respectfully requests that these rejection be held in abeyance until such time as claims 7-12 are indicated as containing allowable subject matter.

In paragraph 3 of the Action, the Examiner rejects claims 1 and 13 under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claim 1 of copending Application Serial No. 10/518,444. Applicant respectfully requests that these rejection be held in abeyance until such time as claims 1 and 13 are indicated as containing allowable subject matter.

In paragraph 4 of the Action, the Examiner rejects claims 7-12 under the judicially created doctrine of obviousness-types double patenting as allegedly being unpatentable over claim 10 of copending Application Serial No. 10/518,444. Applicant respectfully requests that

these rejection be held in abeyance until such time as claims 7-12 are indicated as containing allowable subject matter.

Objections/Rejections to the Specification

In paragraph 5 of the Action, the Examiner asserts that Figs. 16-18 should be designated as prior art because only that which is old is illustrated. Applicant hereby amends Figs. 16-18 to include the legend "Prior Art," thereby addressing the Examiner's concerns.

In paragraph 6 of the Action, the Examiner objects to claims 1, 2, and 7-12 for containing quote marks. Applicant hereby amends claims 1, 2, and 7-12 to remove the quote marks, thereby addressing the Examiner's concerns.

Rejections under 35 U.S.C. 112, second paragraph

In paragraph 7 of the action, the Examiner rejects claim 1 under 35 U.S.C. 112, second paragraph, because there is insufficient antecedent basis for the phrase "the optimal ensemble." Applicant hereby amends claim 1 to correct typographical and/or translation errors, rendering this rejection moot.

In paragraph 8 of the Action, the Examiner rejects claim 2 under 35 U.S.C. 112, second paragraph, as allegedly being indefinite. Applicant hereby amends claim 2 to correct translation errors, thereby addressing the Examiner's concerns. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claim 2 under 35 U.S.C. 112, second paragraph.

Rejections under 35 U.S.C. §103(a)

In paragraphs 9-17 of the Action, the Examiner rejects claims 1-13 under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,789,227 to De Souza et al. ("De Souza") in view of the related art discussed in the background of the instant application ("Related Art"). Applicant respectfully traverses this rejection.

In order to support a rejection under 35 U.S.C. §103, the Action must establish a *prima facie* case of obviousness. To establish a *prima facie* case of obviousness three criteria must be met. First, there must be some motivation to modify/combine the cited references. Second, there must be a reasonable expectation of success. Finally, the combination must teach each and every claimed element. In the present case, claims 1-13 are not rendered unpatentable by the combination of De Souza and the Related Art because the Examiner fails to establish a *prima facie* case of obviousness as discussed below.

In rejecting claims 1 and 5, the Examiner asserts that it would have been obvious to one skilled in the art to modify De Souza with the teaching of the Related Art “to include details of Gaussian approximation in the heuristic search algorithm” because one skilled in the art “would have recognized the need to minimize [sic] a signal-to-noise ratio [sic].” This assertion is unfounded for the following reason.

The Examiner has misinterpreted the Related Art. Nowhere in the Related Art is there any disclosure or suggestion that including Gaussian approximation in a heuristic search algorithm would minimize the signal-to-noise ratio. To the contrary, page 5, lines 17-18 of the specification states “linear programming is employed to search an ensemble that minimizes a Signal to Noise Ratio (SNR).” Therefore, one skilled in the art would not have been motivated to modify De Souza to include Gaussian approximation as suggested by the Examiner. Accordingly, absent proper motivation to modify De Souza, the rejection of claims 1-13 is improper.

Furthermore, even if, *arguendo*, one skilled in the art were motivated to combine De Souza and the Related Art, the combination would still fail to render claims 1-13 unpatentable because the combination fails to disclose each and every claimed element.

Independent claim 1 defines a method of generating a check matrix for a low-density parity-check code in which at least one of the weights of a column and a row is not uniform. The method includes, *inter alia*, determining a coding rate; generating a basic matrix that satisfies the condition that the weights of rows and columns are constant and the number of cycles is equal to or more than six; determining the number of columns and the number of rows of the check matrix to be finally obtained; substituting rows of the basic matrix created, based on a specific relational equation; searching provisionally an ensemble of row weights and column weights of the low-density parity check code by executing a Gaussian approximation based on a predetermined condition before a row deletion; deleting rows of the basic matrix after the substituting in order from a bottom by considering the number of rows to be finally obtained; searching a final ensemble of row weights and column weights of the low-density parity check code by executing the Gaussian approximation based on a predetermined condition after the row deletion; and dividing at random the row weights and the column weights of the basic matrix after the row deletion based on the final ensemble.

De Souza discloses a system and method for generating low density parity check codes using bit-filling. However, as noted by the Examiner, De Souza fails to disclose or suggest provisionally searching an ensemble of row weights and column weights; deleting rows of the basic matrix; searching an final ensemble; and dividing at random as defined by claim 1. The Related Art discussed in the background of the specification discloses conventional methods for generating regular and irregular LDPC codes. However, the Related Art fails to overcome the deficiencies of De Souza.

Since De Souza and the Related Art both fail to disclose or suggest a method of generating a check matrix for low-density parity-check codes that includes each of the steps defined in claim 1, for example, deleting rows of the basic matrix after a substitution step in

order from the bottom considering the number of rows to be finally obtained, the combination of these two references cannot possibly disclose or suggest said steps. Therefore, even if one skilled in the art were motivated to combine De Souza and the Related Art, which Applicant does not concede, the combination would still fail to render claim 1 unpatentable.

Claims 2-12 variously depend from independent claim 1. Therefore, claims 2-12 are patentable over the combination of De Souza and the Related Art for at least those reasons presented above with respect to claim 1.

Independent claim 13 defines an apparatus for generating a check matrix for a low-density parity-check code. The apparatus includes, *inter alia*, a first weight searching unit that provisionally searches an ensemble of row weights and column weights of the low-density parity check code by executing a Gaussian approximation based on a predetermined condition before a row deletion; a row deleting unit that deletes rows of the basic matrix after the substituting in order from the bottom by considering the number of rows to be finally obtained; a second searching unit that searches a final ensemble of row weights and column weights of the low-density parity check code by executing the Gaussian approximation based on a predetermined condition after the row deletion; and a dividing unit that divides at random the row weights and the column weights of the basic matrix after the row deletion based on the final ensemble. Accordingly, independent claim 13 is patentable over the combination of De Souza and the Related Art for at least the reason that the combination fails to disclose each and every claimed element. (See discussion above with respect to claim 1).

For each of the reasons presented above, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-13 under 35 U.S.C. §103(a).

The application is in condition for allowance. Notice of same is earnestly solicited. Should there be any outstanding matters that need to be resolved in the present application, the

Examiner is respectfully requested to contact Penny Caudle (Reg. No. 46,607) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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